

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Spangenberg, et al.	
Application No.: 10/553,507	
Filed: October 10, 2006	Group Art Unit: 1652
Title: Manipulation of Organic Acid Biosynthesis and Secretion	Examiner: Yong D. Pak
Attorney Docket No.: FREE.P-006	Conf. No.: 4691

IDS TRANSMITTAL LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants request that the references listed on Form PTO/SB/08a be made of record in the Patent Office file relating to the above-captioned application. Copies of the references are being submitted with this paper.

For your reference, we have attached a copy of an Australian Search Report dated March 11, 2011 from a related Australian application (application no. 2009200866).

No fee is believed to be due with this paper since this paper is being filed concurrently with a Request for Continued Examination and a Petition to Withdraw from issue.

Respectfully submitted,

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11 March 2011

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Examiner's report no. 2 on patent application no. 2009200866
by Agriculture Victoria Services Pty Ltd

Last proposed amendment no. 2

Dear Madam/Sir,

Thank you for the reply of 09 February 2011 to the last report. My report is based on the specification as if amended by the statement of proposed amendments under S104 filed with that reply and dated the same. I have considered it and believe that there are lawful grounds of objection to the application as proposed to be amended. These grounds of objection are:

3. Claims 3, 5, 22 and 24 are not clear. The claims make reference to sequences through reference to the Figures and reference to the SEQ ID NOs. However the specification does not contain a sequence listing nor identify which sequences in the Figures corresponds to which SEQ ID NO. reference to the SEQ ID NOs is therefore considered not to be clear.

For the purposes of the search and examination, the sequence listing filed with parent Patent 2004228859 has been used.

4. Claim 7 is not for a manner of new manufacture. The claim is directed to a polypeptide but is not limited to the polypeptide when some form of technical intervention is involved, such as being isolated or purified. therefore the claim encompass the polypeptide as occurring in nature which is considered not to be a manner of new manufacture.
5. Claims 1, 2, 7, 20, 21, 27 and 28 are not novel and lack an inventive step when compared with the following document:
GenBank Accession AF346003 "Lolium perenne malate dehydrogenase mRNA, partial cds" 03 April 2001*

The citation discloses the sequence of a malate dehydrogenase from *Lolium perenne* and the sequence of the encoding polynucleotide. Claims 1, 2, 7, 20, 21, 27 and 28 are considered not to be novel over this document.

Furthermore appended claims 15 to 19 are considered not to involve an inventive step over this document. Claims 15 to 18 are directed to the use of the polynucleotide as a genetic

marker, which is considered to be an obvious and well known application in the art not involving any inventive step. Claim 19 is directed to the polynucleotide including SNPs. The person skilled in the art would readily predict the existence of such sequences containing SNPs and identify and isolate them routinely without any inventive ingenuity, meaning claim 19 also is considered not to involve an inventive step.

6. Claims 7, 20, 21 and 28 are not novel and lack an inventive step when compared with the following document:

Chen TM *et al*, "Photosynthetic $^{14}\text{CO}_2$ Fixation Products and Activities of Enzymes Related to Photosynthesis in Bermudagrass and Other Plants", *Plant Physiology*, 1971, 47:199-203*

The citation discloses enzyme extractions from plants including *Festuca arundinacea* (now known as *Lolium arundinacea*) which include malic [malate] dehydrogenase (abstract, page 200). The enzyme extract from *F. arundinacea* is considered to fall within the scope of claims 7, 20, 21 and 28 rendering the claims not to be novel.

7. Claims 1, 2, 15 to 19 and 27 lack an inventive step when compared with the following document:

Chen TM *et al*, *Plant Physiology*, 1971, 47:199-203*

As indicated above, the citation discloses an enzyme extract from *F. arundinacea* including malate dehydrogenase. Further isolation of the enzyme and identification and isolation of the encoding polynucleotide is considered to be routine in the art and not involve any inventive ingenuity. Claims 1, 2 and 27 are therefore considered not to involve an inventive step over this document.

Furthermore appended claims 15 to 19 are considered not to involve an inventive step over this document. Claims 15 to 18 are directed to the use of the polynucleotide as a genetic marker, which is considered to be an obvious and well known application in the art not involving any inventive step. Claim 19 is directed to the polynucleotide including SNPs. The person skilled in the art would readily predict the existence of such sequences containing SNPs and identify and isolate them routinely without any inventive ingenuity, meaning claim 19 also is considered not to involve an inventive step.

8. Claims 3, 4, 7, 8, 10 to 12, 14, 22, 23 and 26 to 28 are not novel and lack an inventive step when compared with the following document:

EP 1 033 405 A2 (CERES INCORPORATED) 6 September 2000

The citation discloses sequences from *Arabidopsis* which have up to 92% identity with SEQ ID NOs: 22, 41, 47, 206, 219, 253, 277, 289, 297 and 307 of the current application. Also disclosed are the encoding polynucleotide sequences, vectors, and the transformation of plants to modify traits. Claims 3, 4, 7, 8, 10 to 12, 14, 22, 23 and 26 to 28 are considered not to be novel over this document.

9. Claim 22 is not novel and lacks an inventive step when compared with a large number of documents. Attached is the *Sequence Search Report* based on the amino acid sequences of claims 22 and 24. (Note that sequences with publication date "n/a" includes sequences published both before and after the priority date – the publication date can be easily established through GenPept.)

As a result of this objection further opinion with respect to novelty is reserved. However it would be expected from these search results that there would also be a similarly large number of documents disclosing sequences which fall within the scope of claim 3.

10. Claims 1 to 28 lack an inventive step over the prior art from objections 8 and 9.

Claims 1 to 7 and 19 to 28 are directed to malate dehydrogenases (MDH) and encoding polynucleotides from *Lolium sp.* and *Trifolium sp.* As the attached search results demonstrate, these enzymes are highly conserved between plant species.

The problem addressed by the current application appears to be the provision of additional MDH sequences from plants. However, given the high conservation of identity between sequences in the prior art, it is considered the person skilled in the art wishing to identify additional MDH sequences, including sequences comprising SNPs, from plants would be able to do so routinely using standard protocols in the art. The specification does not appear to identify anything unexpected or surprising in the specific sequences claimed, or any difficulty requiring an inventive solution in isolating them. Claims 1 to 7 and 19 to 28 are therefore considered not to involve an inventive step.

Appended claims 8 and 10 and 11 are directed to constructs comprising the encoding polynucleotides and plants comprising. This is considered to be standard and routine in the art and not involve an inventive step.

Appended claims 12 and 14 are directed to methods of modifying various traits in a plant comprising transforming the plant with the encoding polynucleotides or the constructs comprising the encoding polynucleotide. The traits are known in the art to be influenced by MDH and it is considered an obvious application to modify these traits through transforming the plants with the encoding polynucleotides.

Appended claims 9 and 13 are directed to the construct and the method of modifying a trait in a plant wherein the MDH encoding polynucleotide is combined with a citrate synthase (CS) encoding polynucleotide. As both enzymes are involved in catalysing adjacent steps of the same biochemical pathway – the tricarboxylic acid cycle – this is considered to be an obvious combination of enzymes not involving an inventive step.

Appended claims 15 to 18 are directed to the use of the polynucleotides as genetic markers. This is a well known application in the art of polynucleotides derived from genomic sequences and its an application considered not to involve an inventive step.

* Attached.

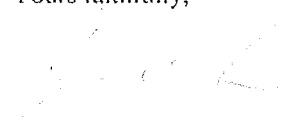
You have until 16 September 2012 to overcome all my objection(s) otherwise your application will lapse.

You will need to pay a monthly fee for any response you file after 12 months from the date of the first report.

You will also need to pay any annual continuation fees that apply. These will normally be first due five years from the filing date. Please note however that earlier commencement dates apply for divisional applications.

Information about fees may be obtained by phoning 1300 651 010.

Yours faithfully,

A handwritten signature in dark ink, appearing to read 'Gareth Cook', is written over a faint, light-colored rectangular stamp or watermark.

GARETH COOK
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